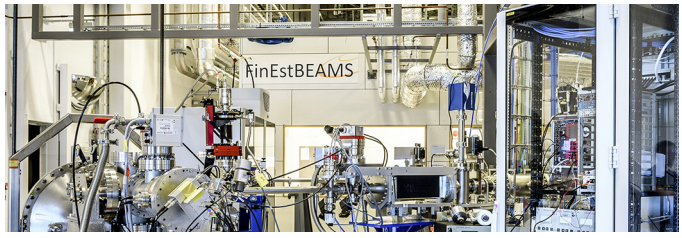
The electronic structure of ionic liquids based on the TFSI anion: A gas phase UPS and DFT study



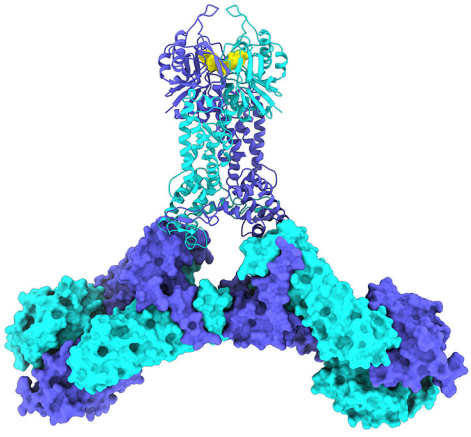
The first scientific article has been published based on results from the Estonian-Finnish beamline FinEstBeAMS.

In this research paper, electronic structure of ionic liquids based on the [TFSI] anions was under investigation: valence band of [EMIM][TFSI], [DEME][TFSI] and [$PYR_{1,4}$][TFSI] gas-phase ion pairs have been investigated using ultraviolet photoelectron spectroscopy (UPS).

The photoelectron spectra have been interpreted by using different density functional and *ab initio* calculation methods.

Read the full story here!

Discoveries map out CRISPR-Cas defence systems in bacteria



Model of the CSX1 protein complex

As published in Nature Communications, researchers from the University of Copenhagen have gained critical insight into how bacteria function as defence mechanisms against attacks from other bacteria and viruses. The study also describes how the defence systems can be activated on cue. This discovery can turn out to be an important cornerstone in fighting diseases in the future. Within this study the researchers could elucidate a high resolution crystal structure by phasing it with the help of a low resolution CryoEM-EM structural model. This study demonstrated the powerful complementary of both methods.

The researchers have shown how a cell attacked by a virus activates a molecule called COA (Cyclic Oligoadenylate), which in turn activates a so-called protein complex called CSX1 to eradicate the attacker.

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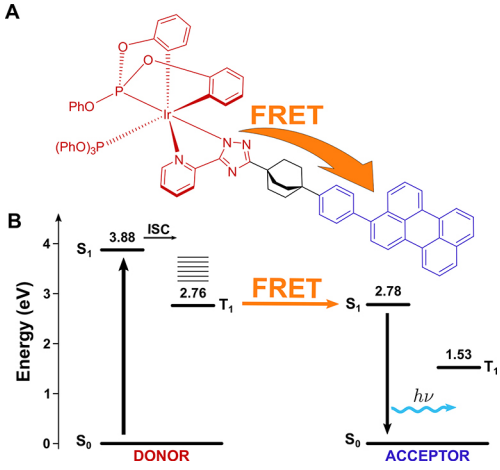
Multiplicity conversion based on intramolecular triplet-to-singlet energy transfer



Structure and energy levels of the dyad. (A) The DBA molecule used in this study. (B) Jabłoński diagram showing triplet-to-singlet energy transfer via dipole-dipole interactions, i.e., the Förster-type resonance energy transfer (FRET) mechanism.

Researchers from Gothenborg University, Stockholm University and MAX IV have designed a novel organic dye, which was synthesised and could be structurally characterised at an atomic resolution at BioMAX.

The article is published in Science Advances.

Using spectroscopical methods, Alexei Cravcenco from the Börjesson group could show a 36 times higher energy transfer efficiency compared to the classical emission form isolated electronic triplet states.

This dyad provides the first solid proof that Förster-type triplet-to-singlet energy transfer is possible, revealing a method to increase the rate of light extraction from excited triplet states.

Read the full story here!